

**Request to Archive  
With The National Centers for Environmental Information  
For Sudden Stratospheric Warming Compendium  
Provided by NOAA/OAR/ESRL**

**2015-09-17**

This information will be used by NCEI to conduct an appraisal and make a decision on the request.

**1. Who is the primary point of contact for this request?**

Amy Butler  
NOAA/OAR/ESRL  
Research Scientist  
amy.butler@noaa.gov

**2. Name the organization or group responsible for creating the dataset.**

UCO/CIRES > Cooperative Institute for Research in Environmental Sciences, University of Colorado;  
NOAA/ESRL/Chemical Sciences Division

**3. Provide an overview summarizing the scope of data you want to archive. Describe the outputs, data variables, including their measurement resolution and coverage.**

We want to archive historical sudden stratospheric warming (SSW) events. There are approximately 40 major SSW events in the Northern Hemisphere during 1958-2014, plus some minor and final SSW events, and a few events in the Southern Hemisphere. For each event, we will be providing temperature, zonal wind, geopotential height anomalies, potential vorticity, precipitation/snowfall, and sea level pressure at multiple levels throughout the atmosphere and at the surface for days -30 to +60 from the event. The data will be provided from multiple reanalysis products to facilitate comparison between datasets. Native horizontal resolution of the reanalysis product will be used for surface variables but in the troposphere and stratosphere we will use a common 2.5x2.5 degree grid. The temporal resolution will be daily. We will provide code to output various metrics, time series, and plots from these data.

**4. What is the time period covered by the dataset? (YYYY-MM-DD, YYYY-MM or YYYY)**

From 1957-11-01 to 2015-04-01

**5. Edition or version number(s) of the dataset:**

version 1.0

**6. Approximate date when the dataset was or will be released to the public:**

2016-03-31

**7. Who are the expected users of the archived data? How will the archived data be used?**

Mainly researchers, forecasters, general public, and media. The data will be used to show impacts from individual or composite historical SSWs, and provide a reference for potential surface weather and extreme impacts of future SSWs.

**8. Has the dataset undergone user evaluation and/or an independent review process? Did NCEI participate in design reviews?**

The dataset is the basis of our funded NOAA CPO proposal, which has been evaluated and reviewed. There will also

be a peer-reviewed article on the Compendium, to be submitted in the winter of 2015-16. In addition, aspects of this archive will be used and evaluated by the SPARC Reanalysis and Intercomparison project, as multiple reanalyses will be included in the database.

**9. Describe the dataset's relationship to other archived datasets, such as earlier versions or related source data. If this is a new version, how does it improve upon the previous version(s)?**

The dataset utilizes publicly available and peer-reviewed reanalysis products. The main features of this dataset that add value to currently available data are the identification of specific dates of SSW events and the use of daily data to examine impacts in the stratosphere and troposphere following SSW events. Analysis and diagnostics that are both specific to these SSW events and not produced for the reanalysis products will be included in this dataset (such as wave amplitudes and eddy heat fluxes).

**10. List the input datasets and ancillary information used to produce the data.**

Reanalysis datasets- ERA-Interim, NCEP-NCAR I, MERRA, JRA-55, ERA-40.

**11. List web pages and other links that provide information on the data.**

We plan to have both a peer-reviewed paper detailing the dataset, and a website at NOAA/ESRL providing general information about the dataset.

**12. List the kinds of documents, metadata and code that are available for archiving. For example, data format specifications, user guides, algorithm documentation, metadata compliant with a standard such as ISO 19115, source code, platform/instrument metadata, data/process flow diagrams, etc.**

1. IDL source code used to generate figures and analysis
2. Netcdf files following CF convention and netcdf metadata guidelines for IOC NOAA Climate Data Records (CDR)
3. Peer-reviewed publication (to be written) documenting the data and its usage

**13. Indicate the data file format(s).**

1. netCDF-4

**14. Are the data files compressed?**

No

**15. Provide details on how the files are named and how they are organized (e.g., file\_name\_pattern\_YYYYMM.tar in monthly aggregations).**

Not yet known, but we will seek guidance from NCEI and follow recommendations.

**16. Explain how to access sample data files and/or a file listing for previewing. If it is not available now, when will it be available?**

Available January 2016

**17. What is the total data volume to be submitted?**

**Historic Data: all historic data or data submitted as a completed collection.**

Total Data Volume: 1TB

Number of Data Files: 200

**18. Are later updates, revisions or replacement files anticipated? If so, explain the conditions for submitting these additional data to the archive.**

When future SSW events occur, we plan to add additional data to the archive as resources permit. These events occur

approximately once every other winter.

**19. Describe the server that will connect to the ingest server at NCEI for submitting the data.**

Physical Location: NOAA, David Skaggs Research Center, Boulder, CO, USA  
System Name: Various  
System Owner: NOAA/ESRL/Chemical Sciences Division  
Additional Information: Local workstations with mounted centralized file systems

**20. What are the possible methods for submitting the data to NCEI? Select all that apply.**

1. FTP PULL
2. FTP PUSH
3. SFTP PUSH

**21. Identify how you would like NCEI to distribute the data. Web access support depends on the resources available for the dataset.**

1. User interface to order and stage data for download
2. Direct download links

**22. Will there be any distribution, usage, or other restrictions that apply to the data in the archive?**

Constraint Type	Description
Use	Acknowledgement of using the Compendium and citation of our peer-reviewed journal article

**23. Discuss the rationale for archiving the dataset and the anticipated benefits. Mention any risks associated with not archiving the dataset at NCEI.**

We anticipate that this archive of SSW events will be useful in the following ways:

- (1) As a research tool to advance understanding of extreme events in the stratosphere and their coupling to wintertime tropospheric weather extremes.
- (2) As an observational record for evaluating representation of SSWs in historical and future climate model simulations.
- (3) As a basis for climate monitoring and forecasting of SSWs and their possible surface responses.
- (4) As an education and outreach tool through NOAA's Science on a Sphere (whom we have been in contact with to pursue this possibility), to bring the evolution and impacts of SSWs to life for students and the general public.

In summary, this comprehensive, long-term database of SSW events will include numerous analyses (from simple to complex, including time series, maps, and animations) that will make it easy for the user to visualize the stratospheric dynamics occurring in each event and the impact on tropospheric weather extremes, without having to calculate or code it themselves. The Compendium will document one of the most extreme events in the earth's atmosphere, provide information about how SSWs relate to extremes in surface climate, serve as a basis for evaluation of stratospheric variability in climate models, potentially improve conditional seasonal forecasts following SSWs, and be integrated into public outreach tools such as the Science on a Sphere.

**24. Are the data archived at another facility or are there plans to do so? Please explain.**

We will likely provide access to some figures and animations from the dataset on the NOAA/ESRL webpage for our collaborators at other institutions. However, we will rely on NCEI to archive the complete database, provide availability to all users, and maintain the archive over the long-term, all tasks which ESRL cannot at present support.

**25. Is there an existing agreement or requirement driving this request to archive? Have you already contacted someone at NCEI?**

In our proposal to NOAA CPO, we contacted Ms. Nancy Ritchey, Chief of NCDC's Archive Branch (at the time), about archiving this dataset. She determined that the sudden stratospheric warming dataset is consistent with NCEI's mission and data holdings. She agreed in principle to archive and disseminate the dataset, and to develop a plan for updating the atlas, if funds to support those activities are provided through our proposal. Theoretically, our funding manager Jennifer Saleem Arrigo from NOAA Climate Program Office supports our plan to archive the database with NCEI, though we need to amend the the proposal budget to account for the cost once it's determined. We agreed to work with NCEI to make sure that data formats, metadata, etc., are in compliance with federal regulations and best practices for data stewardship.

**26. Do you have a data management plan for your data?**

No

**27. Have funds been allocated to archive the data at NCEI?**

We do have funds available through our NOAA CPO proposal, but because the size and complexity of the data sets are not knowable in advance, we did not include a budget item in the proposal to cover those costs. (We note, however, that, relative to large satellite or model output datasets, our data products are likely to be significantly smaller.) During the current year of the project (Year 2) an amended budget will be prepared that includes support for these important data sharing efforts in Year 3. Based on past similar arrangements with NCEI, we anticipate a productive collaboration that will result in easy access to our datasets by colleagues around the world.

**28. Identify the affiliated research project, its sponsor, and any project/grant ID as applicable.**

NOAA Climate Program Office

"A comprehensive atlas of mid-winter Sudden Stratospheric Warmings and associated surface climate extremes"

PI: Dian Seidel

Co-PI: Amy Butler

NOAA-OAR-CPO-2014-2003692

Climate Observations and Monitoring (COM)

Datasets and Indicators- Data Sets for Weather/Climate Extremes

**29. Is there a desired deadline for NCEI to archive and provide access to the data?**

Archive by: 2016-05-01

Accessible by: 2016-05-31

**30. Add any other pertinent information for this request.**

None